aetiology ($P < 0.0014$) were significant risk factors for 30 day mortality on multiple logistic regression. Survival for all groups (±SEM) including in hospital mortality at 1, 5, and 10 years was 87.28% (± 1.28), 70.7% (± 2.09) and 47.52% (± 3.45) respectively. Factors associated with a significantly worse prognosis on Cox's proportional hazards model included higher preoperative NYHA status ($P < 0.0034$), LV dysfunction: ($P < 0.0012$), increasing age at operation ($P < 0.0001$), aetiology of regurgitation (ischaemic worst ($P < 0.01$) and valve replacement rather than repair ($P < 0.034$).

Conclusion: Mitral valve surgery for degenerative MR is associated with low mortality, especially when repair is possible. Ischaemic MR, traditionally thought to carry a worse surgical prognosis, had a low mortality similar to rheumatic disease.

1068-43 Age, Coronary Disease, and Thromboembolism Risk After St. Jude Mechanical Valve Replacement

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Background: Reported thromboembolism (TE) rates vary widely between institutions for the same prosthetic valves. We hypothesized patient age was an important factor explaining variations in TE rates.

Methods: We analyzed TE data in 978 consecutive patients undergoing St. Jude valve replacement (4,319 patient-years). Patient groups were aortic (AVR), mitral (MVR), and double valve (DVR).

Results: Elderly patients (≥65 years) had more diabetes (DM), hypertension (HTN), coronary disease (CAD), and underwent coronary bypass surgery (CABG) more often. TE rates were significantly higher in the elderly ($P = 0.02$). Univariate risk factors for TE were age, presence of CAD, concurrent CABG, DM, and HTN. In multivariate analysis, only CABG ($P = 0.01$) was a significant risk factor for TE.

Linearized TE rates (Events/100 pt years):

		MVR	AVR	DVR	Total
Age	<65	2.3	1.7	2.5	2.1
	≥65	2.6	3.1	3.8	3.0
CABG	N	1.7	1.9	2.8	1.9
	Y	3.6	3.3	4.0	3.6

Conclusions: Although TE rates are higher in the elderly they are also associated with other coronary risk factors. Multivariate analysis suggests coronary atherosclerosis is a strong underlying risk factor for long term TE risk. The mechanisms of the association of CAD with future TE risk in prosthetic valve patients are not clear.

1068-44 Long-term Follow-up of Atrial Contraction Following the Maze Procedure in Patients With Mitral Valvular Disease

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Background: Although the Maze procedure for atrial fibrillation (Af) has been effective to restore sinus rhythm (SR) with mitral valvular disease, the long-term results of this procedure has not been determined.

Methods: We echocardiographically studied 94 consecutive patients with mitral valvular disease (age, ± 9 years) before, early (3.1 ± 3.3 months) and late (2.2 ± 0.9 years) after the Maze procedure. The mean follow-up period was 2.4 ± 0.9 years (range, 0.9–4.5 years). Measurements included left atrial diameter (LAD), left ventricular diastolic diameter (LVD) and the peak velocity (Av, cm/s) and time-velocity integral (Ai, cm) of late diastolic filling wave (A-wave) obtained from transmittal flow recordings. Atrial filling fraction (AFF, %) was calculated as a fraction of Ai to time velocity integral of total diastolic filling.

Results: Left atrial and ventricular diameters significantly decreased after the procedure (from ± 12 to ± 7 mm, $p < 0.01$ for LAD, from 54 ± 9 to 47 ± 6 mm, $p < 0.01$ for LVD) and did not show significant changes during the follow-up period.

	SR	Af	A-wave	Av	Ai	AFF
Early	70 (75%)	24 (25%)	41 (44%)	46 ± 17	4 ± 1	17 ± 6
Late	65 (69%)	29 (31%)	32 (34%)	45 ± 14	4 ± 1	17 ± 6
p value	NS	NS	NS	NS	NS	NS

Conclusions: 1) Sinus rhythm and atrial contraction recovered early after the Maze procedure in most patients, and they were maintained for more than 2 years. 2) Once active atrial contraction was resumed, the degree of contraction did not change thereafter. 3) These results demonstrate that the Maze procedure is effective for a long period in patients with mitral valvular disease.

1068-45 Indexed Effective Orifice Area at Rest Predicts Increase in Gradient During Maximal Exercise in Patients With an Aortic Valve Bioprosthesis

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Patients with aortic bioprostheses do well despite relatively small effective orifice areas (EOA) and high transprosthetic gradients (TPG) at rest. However, few data have been collected in these patients during exercise. In this study, 19 patients with a normally functioning Medtronic Intact bioprosthesis and preserved left ventricular function were submitted to a maximal ramp upright bicycle exercise test using workload increments of 10 Watts/min. EOA and mean TPG were measured at rest and during exercise using Doppler echocardiography. EOA was measured by the continuity equation and mean TPG by the Bernoulli equation with inclusion of prevalvular velocities. At peak exercise (mean maximal workload: 114 ± 58 Watts), cardiac index increased by 3.29 ± 0.75 L/min/m^2 (122 ± 29%; $p < 0.0001$) whereas mean TPG increased by 11 ± 7 mmHg (84 ± 50%; $p = 0.0001$) and EOA by 0.19 ± 0.18 cm^2 (12 ± 11%; $p = 0.007$). A strong correlation was found between the increase in mean TPG during maximal exercise and the EOA at rest indexed for body surface area ($r = 0.86$, SEE = ± 4.0 mmHg; $p = 0.0008$) and the increase in EOA with exercise also correlated with the indexed EOA at rest ($r = 0.63$, SEE ±0.15 cm^2, $p = 0.05$). Due to the increase in EOA, the increase in TPG was less (−12.2 ± 5.9 mm Hg; $p = 0.002$) than predicted theoretically, had the EOA remained fixed. Thus, in these patients, the increase in mean TPG with maximal exercise could be predicted accurately from the indexed EOA at rest. The actual increase in TPG was however less than expected due to the potential of EOA to increase during exercise. Further studies are necessary to determine how these relations apply to other types of prostheses.

1068-46 Long Term Maintenance of Sinus Rhythm by Combined Valve and Arrhythmia Surgery in Patients With Mitral Valve Disease and Atrial Fibrillation

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Background: Atrial arrhythmia surgery in addition to valve surgery in pts. with atrial fibrillation [AF] is advised because serial cardioversion therapy of AF after valve surgery generally fails. We investigated rhythm outcome in pts. with a history of AF who underwent mitral valve surgery in combination with a left atrial isolation [LAI] procedure.

Methods: 14 pts. with significant mitral valve disease (1 mitral stenosis [MS], 11 mitral regurgitation [MR], 2 MS/MR) of different etiology underwent the combined procedure. NYHA class was 2.9 ± 0.5. Chronic AF was present in 11 pts (in 2 pts. >5 years), 3 pts. had previous AF. Mitral valve repair was possible in 9 pts., 5 pts. received a valve prosthesis. LAI procedure took an additional 30 to 40 minutes and consisted of atrial incisions, cryoablation and resection of both appendages.

Results: All pts. were in sinus rhythm [SR] immediately after surgery. Relapse of AF occurred in 10 pts. and within 7 days (peak incidence on day 3). At hospital discharge 7 pts. were still in AF, but 2 months later all had spontaneously converted to SR. During follow up (median 6 months, range 3–17 months) no new relapses of AF occurred.

Conclusion: Combined mitral valve surgery and left atrial isolation provide long term SR in pts. with a history of AF. As the procedure time of left atrial isolation is shorter than of the Cox-maze operation, left atrial isolation seems preferable for combined surgery.

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Georgia World Congress Center, West Exhibit Hall Level
Presentation Hour: 3:00 p.m.–4:00 p.m.

1069 154 Closure of Muscular Ventricular Septal Defects With Modified Amplatz Device in a Canine Model

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Background: Repair of multiple ventricular septal defects (MVSD) has always been challenging to the surgeon. The long term morbidity and mortality is significantly increased if the defects are closed via left ventriculotomy or